Abstract

A cluster router architecture and methods for performing distributed routing are presented. The cluster router architecture includes off-the shelf Personal Computer (PC) hardware-based router cluster nodes interconnected in an intra-connection network in multiple dimensions. Each PC-based router cluster node is provided with the same routing functionality and a router-cluster-node-centric configuration enabling each router cluster node by itself or multiple router cluster nodes in the cluster router to provide routing responses for packets pending processing. Optimized packet processing in respect of specific functionality is provided via special purpose router cluster nodes not necessarily PC-based taking part as cluster nodes in the cluster router lattice. The method divides packet processing into entry packet processing and routing response processing; special processing; and exit processing. Entry packet processing and routing response processing is performed by router cluster nodes receiving packets from communication networks in which the cluster router participates. Exit packet processing is performed by router cluster nodes transmitting packets into communication networks in which the cluster router participates. Packet processing in accordance with the router-cluster-node-centric specification is interrupted on determining that special processing is required in respect of a packet, and the packet is handed over to a corresponding special purpose router cluster node. Advantages are derived from: a configurable, and scalable cluster router design providing a re-configurable high routing capacity using cost effective stock PC hardware; from the intra-connection network which provides a high degree of diversity ensuring resilience to equipment failure; from the use of a star topology with respect to management links which reduces management overheads in the intra-connection network; and from the ability to forward packets to designated special purpose router cluster nodes optimized to provide specific packet processing functionality.